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NEVER-FAILING FUSE.

A Mechanical Apparatus That Acts Only After a Certain Distance Is Traversed.

Gunpowder has made the little fighting man as good as the big man. It seems as though the perfection of cheap mechanical fire-arms will soon render the little nation the equal of the big nation in the matter of defense at least. It has generally been recognized among military authorities that the next great advance in their art must come in the artillery branch of the service. The central-fire cartridges, repeating rifles, telescopic and graduated sights have brought the small arms nearly up to their highest point of efficiency. With the artillery accuracy of range for solid shot and percussion shells, along with rapidity of firing, have also been acquired. These are of the greatest benefit to an attacking party who have to batter down cities and fortifications, but they are of little use in defense against light, rapidly-moving batteries and masses of infantry. Solid shot and percussion shell go hurtling over their heads or plow up the ground. Only when a lucky shot dismounts a gun or explodes a magazine is any real execution done.

Shrapnel is the most effective missile for the destruction of men. With shrapnel the great difficulty heretofore has been the inaccuracy of the fuse. The ordinary powder fuse is a time fuse, and even though the utmost care be taken in its construction, lack of homogeneity in material, dampness, etc., will cause it to vary in time of burning. When to this is added variations in the time of flight of the projectile due to variations in the quality and amount of powder used behind it, there is an accumulation of variable conditions that renders the probability of the shrapnel's explosion any where within a mile of the desired point inconsiderable. A perfect fuse must, then, be a mechanical one which will be accurate in its working and not affected by age and moisture as the chemical fuse is. It should also be a distance-fuse, which will act at the expiration of a certain distance instead of a certain time. Thus the disturbing effect of variations in the charge and the dangers of premature explosion, along with all the other sources of inaccuracy are removed.

For twelve years the Berdan "range-finder" has been in use by all Governments. It is an arrangement of two telescopes which, on the principle of a simple problem in triangulation tells the distance of any object within six miles, on a graduated scale. But the usefulness of the range-finder has been restricted in cases where shrapnel was to be fired, because of the inaccuracy of the fuse. There was little use in an officer's being able to tell that a battery wheeling into line in front of his position was just 10,950 feet away if he could not depend on the fuses to explode his shrapnel within 2,000 feet of the battery. As the result of six or seven years' work, there has been perfected within the last few months a mechanical distance-fuse which is compact in form, cheap and accurate. The combination of this with the range-finder will render the lot of the attacking party any thing but a happy one. This compact and simple little piece of mechanism swings in a little cavity in the nose of the shell and does not turn. The shell receives a twist by the rifling of the gun and makes just so many turns for every thousand feet traversed, no matter what its velocity is. By means of a neat little train of an endless screw working in a gear-wheel, which is also an endless screw and turns a third gear, the motion of the shell is reduced a thousand times before it reaches this last gear. When the third gear has been turned a certain distance, determined by properly setting it, a spring is released and the shrapnel is exploded, scattering a thousand bullets about the neighborhood. A percussion cap placed in the nose of the shell causes it to explode if it hits any thing in its flight. In practice the fuse is found to work with great accuracy and the second shot has generally blown the target entirely to pieces. Three minutes are generally allowed for a battery to swing into line and unlimber. This gives the defenders time to get their range and fire three shots. In practice the first shot has never failed so to sweep the spot where the supposed battery was that the other two were unnecessary. The Turks are now manufacturing these fuses by the thousand, and many other governments, especially the smaller ones, are clamoring for them. It is claimed that the combination of these with the range-finders will give the defending party such an advantage that nations will let one another alone, or at least think twice before they go forth conquering and to conquer. The Russian Minister of War, when a model of the apparatus was shown, expressed his fears that it would be impossible to recruit his army if such deadly accuracy was possible. The old officers might stay, but the young men would seek some less certain path to death. The wily Turk promises to snap his finger in the face of Europe and settle the Eastern question all by himself if a year's leisure to introduce this invention is given.—*N. Y. Tribune.*

BABY'S PICTURE.

The Experience of a Photographer Who Tells How It Is Taken.

"When the baby is to be photographed a family consultation is held, and all the adult female members are detailed to go to the photographer and see the performance through," said a leading photographer recently. "We are pleased," he continued, "if the retinue is confined to the youngster's relatives, but generally a neighbor or two are added to the train to give an unbiased opinion, I suppose, and we generally know it's a baby by hearing the approach of the body-guard on the stairs. In a recent case the fond father had been coaxed to come and see baby's picture taken. He looked bashful and awkward. His pretty little wife blushed half the time—it was the first baby, you see—and the grandmother, two aunts—one of them an old maid—and a neighbor assumed charge of the affair. I knew at a glance that it was useless for me to protest. The old maid aunt seized hold of the baby and placed him on the chair. I only ventured to arrange some of the drapery. The youngster, as soon as he saw the camera turned full at him, began to cry. This was the signal for the performance to begin. The mother attempted to smile at her darling, but the effort came near ending in tears. The grandmother, who had provided herself with a large jumping-jack, painted red, white and black, stood beside the camera, clucking at her whimpering grandson, and working the toy in an energetic manner. One of the aunts flourished a baby rattle, the nurse fluttered a red pocket handkercief and the attending neighbor blew lustily on a small tin horn. The father said nothing, but stood in an attitude a la Lord Dolphin, and looked as if he were about to exclaim: 'Oh, ah!' The baby stopped crying at once, and put on a look of amazement which was half, also, of fear, and with this expression I was compelled to be content. The grandmother said it was just a perfect picture, which it was not, for the child's eyes looked as if they were about to fly from their sockets. But grandmas said it was all right. She had had her circus."

"What kind of babies are the most difficult to manage?"

"Oh the babies, which are not babies. What I mean by this paradox is that we have little trouble comparatively with the very little babies themselves. It is when the subject is just on the border land between babyhood and childhood, when they are old enough to be spoiled, to be ill-natured and to dimly comprehend what is going on about them, that the photographer's misfortunes begin. Some of them will cry and kick, and do all sorts of ill-natured things when they are put in the chair. We not infrequently get our shins skinned by these precocious youngsters, but we must bear our pain with fortitude and smile in the midst of agony."

"Do you ever fail utterly?"

"Very seldom. Sometimes sugar-plums succeed as a last resort, but not infrequently diplomacy is as successful with the children as with their parents. Recently a little girl, just able to walk, but with a terribly obstinate temper, was brought up, attended by the customary retinue of relatives and acquaintances of the family. When she was asked to take the chair she planted herself firmly in the middle of the floor and exclaimed with a frown: "Tot won't do." I put on my most insinuating smile and produced a very pretty toy. The little spitfire sucked her thumb and looked askance, but would not budge. A most wonderfully colored stick of candy had no effect. She was bound not to take a seat in the chair.

"At last I said: 'Well, Tot, I won't take your picture and I want you to go right out of here, for I have another little girl who wants her picture taken, and you must go.' 'Me won't go,' she said. 'Well, then,' said I, 'you must now don't go and get in that chair; you must stay right here.' The child took her thumb out of her mouth and began to edge up toward the chair. 'Now, Tot,' said I, 'you must not get in that chair; it is for that other little girl.' All this time I was getting the camera ready, and had the little bulb in my pocket, without attracting 'Tot's' attention. She was bound to get in the chair now, and she did. I pretended to be attempting to get her out of it, but was all the time arranging her dress, while my assistant was getting the camera at a proper focus. Finally, I said: 'Now, Tot, I don't want you to stay in that chair; but if you will stay there, you must not look at my pretty bird here.' This attracted her eyes toward a stuffed bluebird, which was mounted on a tall pole at the right of the camera. 'Tot will look,' said she, and at once became interested. This was my opportunity. I squeezed the bulb, and before she knew it we had a first-class negative. All this must be annoying, you say. Well, we charge for it. That's why it costs a little more to have a baby's picture taken than it does to get an adult's photograph.—*N. Y. Mail and Express.*

EDUCATION OF HORSES.

Denton Offutt's Great Rule, "Be Kind to Them in All Things."

Denton Offutt, who printed in 1854 a book on horse education, which he furnished to his pupils under a bond of secrecy and at a cost of three hundred dollars' each, emphasized the fact that there was a wide difference between breaking an animal and teaching it to obey. Breaking a horse, he insisted, commonly meant spoiling the horse. The system which he taught was based upon judgment, study of temperament and firmness divorced from cruelty. He classed under three heads the one-toed animals which stood in greatest need of education—"the wild, the stubborn and the fighting horse." And his first caution was: "Be kind to them in all things."

The rules laid down by Offutt for teaching horses to heed the word of command are essentially the same as those practiced by his followers. The most careful of the instructors have enlarged upon his method of treatment, but they have not attempted to get away from the roots of the plan. In the quaint dialogue "between man and horse," as written by Denton Offutt, and which contained the essence of all that the painstaking instructor Rarey ever taught, these golden words drop from equine lips: "You must let me see that you will not hurt me, nor will have any thing about you that will, not any thing that smells badly. I am a stranger to you; all that will offend any of the five senses I will be compelled to guard against, and those senses must have the proof that you will not hurt me before I will allow your hands to be on me."

Every man who in the last thirty odd years has successfully illustrated the art of subduing horses has stuck to the rule which requires an appeal to the understanding of the animal. The devices which Offut used for throwing and getting full control of unruly horses were cruder than those in present use, but the principle has undergone no change. And the advice which Offutt gave his class in 1854 is valuable to those who seek instruction now: "You must have some judgment of your own, for I can not point out the case to suit you all. If I teach you the rules and principle, you must work out the sum."—*N. Y. Herald.*

QUEER MONEY.

Venerable Paper Currency and Mormon Gold Pieces in the National Museum.

Among the curiosities in the National Museum at Washington is the collection of obsolete paper money. A writer describes some of the more striking of these interesting specimens of antique currency, beginning with what is known as Shepherd's money, which is still in some parts of Mexico. The money in question consisted of two bits of paper about the size of a fifty-cent shinplaster. The notes are printed on white paper, in black, without any attempt at ornament or any of the usual devices to baffle counterfeiters. The notes are dated at Hacienda de San Miguel, Batopilas, and the text upon them is in Spanish. One note is for twenty-five and the other for fifty cents. In the lower corner is printed the name Alexander R. Shepherd, well known in this city. A card near the notes informs the curious people who stop to look at them that such notes are in general circulation in the Batopilas district and are preferred by the people there to the paper money issued by the Mexican Government. A very extensive collection of coins and specimens of money has been placed on exhibition in the museum. A curious piece of money is a bit of pasteboard, about the size of a street-car ticket, and marked with a pencil by the man that issued it. The one exhibited is for three cents, and was issued by a business house in Mexico. This pasteboard money has been legalized by the State of Tamaulipas.

Among the coins is a five-dollar gold piece coined by the Mormons at Salt Lake City in 1849. This piece was presented to the museum by Mr. Joseph Libbey, of West Washington. It is ornamented with a representation of a nitre and an eye, and inscribed with the words "Holiness to the Lord." There are also specimens of Mormon paper money issued as late as 1865.

Many of the small Mexican coins shown are cut in two in the center. It is the custom of the people in some districts in Mexico, when they want to make change to cut the coins. A ten-cent piece will be cut in halves, and each half will pass for five cents.

The collection is very rich in specimens of colonial and continental money or bills. There is one bill for forty shillings issued under the authority of "the assembly of Pennsylvania." The spelling did not affect the value of the note. The bills issued under the authority of Congress during the revolutionary war entitled the bearer to receive the amount of the bill in "Spanish milled dollars or the value thereof in gold or silver." An old note for five dollars, issued by the bank of Washington January 12, 1811, is among other old relics shown. In another case is a bond or note which reminds one of the later attempts at financiering on the part of champions of the Irish republic. It is a bond issued at New York, January 1, 1852, for ten dollars, by Louis Kossuth, payable "on demand one year after the establishment in fact of the independent Hungarian Government." A curious thing, showing how English accounts were kept or justified for many centuries and down to recent times, is a tally stick displayed in one of the cases. This is a long stick which has been deeply notched. The method of registering by tallies was practiced by the English Court of Exchequer from the time of the Norman conquest until 1783. It is the same system as that now practiced sometimes by milkmen who keep account of their credit sales by notching a stick. In the English system the sum paid to the bank was marked on the side of a willow or hazel stick. The stick was notched by the Cutter of Tallies, and inscribed in Roman characters by the Writer of Tallies. A small notch represented a penny, a larger one a shilling, a still larger one a pound, a still large one one hundred pounds, and so on. When the stick was prepared it was split in two by the Deputy Chamberlain. It was split in such a way that the notches appeared on both halves. One-half of the stick was deposited in bank and the other held by the person paying the money as a receipt. One was called the tally, the other the counter-tally. In 1834, after a new system of counts was introduced, the tally sticks, which had accumulated in great numbers, were burned in the stoves of the House of Lords. The dry old sticks made an intense heat and set fire to the Parliament buildings, which were completely destroyed. The tally stick at the National Museum is a gift from Mr. A. M. Franks of the British Museum. It registers the payment of £100,000 in part principal on a loan £140,000 due September 30, 1789, and paid November 28, 1776.—*Washington Star.*

TRAINING DOGS.

Kindness and Forbearance More Effective Than Brutal Cruelty.

"All dogs," remarked Mr. C. C. Hough, an experienced trainer, "can not be taught precisely the same kinds of tricks. For example, you would hardly expect a mastiff to sit up or walk down street with a roguish smile on his face, a pipe in his mouth and a hat on his head tipped much to one side, but this is just what you would expect of a poodle. It may be that there are some very intelligent-looking animals that it would be almost impossible to teach, but these are very few. Dogs generally take great delight in learning and in being considered clever, and they soon learn not only to please their masters, but to please their own canine vanity as well. Now, unless you love your dog, and he loves you, and you can put yourself in accord, as it were, with his mind, through the medium of that affection, you will utterly fail in teaching him a single accomplishment worthy of a name. It is a great mistake to suppose that the whip is essential to the government and regulation of these animals. They are too often abused by their teacher when it is his own error. To whip a puppy ten minutes after he has committed an error would be absurd, as his latent natural instinct is almost lost for the time being, but if he is punished the instant the fault is committed, he at once recognizes the cause of the punishment. On no account will it do to whip him more than once a day, for if you continue to lash him his instincts become mixed and he remains the same as when his schooling commenced, except that he will be cowed. Every animal which possesses an average quantity of good sense and temper is so eager to please that he will exert himself to the utmost to obtain the good will of his master, and if this fact were kept in mind there would seldom arise a demand for corporal punishment. Three out of every five dogs may be completely trained without a blow. Patience and forbearance are virtues that must be studied, and while giving lessons the trainer should never lose his temper, as no amount of forced work is of any use. While the trainer is patient, kind and forbearing, he must also be persistent and firm. A puppy should have but one teacher, no matter how close the methods of two trainers may agree. Another secret of success on the part of the teacher is to speak distinctly and slowly. He should always use precisely the same intonation of voice, the same look and motions, as well as the same words, as dogs often go a good deal by this. I would have no hesitation in undertaking to train a clever dog entirely by the dumb show method, and would prefer a setter or pointer trained in this way, as they are then more easily ruled without a noise in the field. Quite a variety of tricks may be taught them, and the wiser they are and the wiser they look the more teachable they will be."—*Indianapolis Journal.*

SNAG-BOAT NO. SIX.

The Largest Craft of Its Kind Afloat in American Waters.

Down on the Allegheny wharf, toward the point, there lies a veritable monster in the way of a steel-hulled vessel. For months a great corps of workmen have been engaged in putting this monarch of the interior waters into shape, and in a few days she will be launched and taken to St. Louis to complete her rigging. The vessel in question is the new steel-hulled snag-boat, which has been built by a Pittsburgh firm for the United States Government. The vessel will be the largest snag-boat afloat in American waters. It was built under the direction of Major A. M. Miller, of the United States corps of engineers, and the work was superintended by Captain E. F. White. It has cost $57,000 to build, and weighs about four hundred tons. By means of the apparatus with which the vessel is to be provided, she can readily lift an obstruction of one hundred tons weight from the bottom of the river. The boat is called the Charles R. Sutor, snag-boat No. 6, and will ply along the Lower Ohio, Mississippi and Missouri rivers, her crew consisting of forty-three men.

The vessel is of the pattern known as the twin-bow snag-boat. She is 187 feet long from stem to transom, 52 feet beam, exclusive of guard, and 75 feet over the guards. The hold is 7 feet deep amidships, and the stems, or two bows, 30 feet apart, at a distance of 65 feet from the bearding line of the stem. Measured directly aft, she is 5 feet 11 inches apart, and the top side is united by a transom 16 inches deep. Aft of where the forward transom ends in a single hull she is 48 feet 10 inches wide. Her rudders are hung on a vertical skeg on the outward side of each transom. The after-rake end is 11 feet 6 inches forward of the transom. Between the double bows there is built a wooden beam plated with iron 3-4 of an inch thick. There are three longitudinal bulkheads—one in line of each stem and one midway between them. There is a cross-bulkhead aft of the stern, and three bulkheads entirely across the boat. In addition there is a bulkhead 100 feet from the stern, where the engine-room will be located. These bulkheads are water-tight, dividing the boat into twenty-one compartments.

From the decks on each of the bows provision has been made to carry an immense pair of spear-poles with the necessary tackle for lifting fifty tons. The guards are 12 feet 9 inches wide amidships. Over the well formed by the two bows there is built a frame work carrying a heavy windlass capable of raising 100 tons dead weight.—*Pittsburgh Dispatch.*

—At some of the afternoon "teas" no tea is served at all. Again we ask, "What's in a name?"—*Lowell Citizen.*

—"We were both the victims of a too heavy load," as the burst gun said to the drunken sportsman.—*St. Paul Herald.*